



the **ENERGY** lab

## PROGRAM FACTS

Strategic Center for  
Natural Gas & Oil

# Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research Program

The Department of Energy's (DOE) Office of Fossil Energy supports research and policy options to ensure clean, reliable, and affordable supplies of oil and natural gas for American consumers. The National Energy Technology Laboratory's Strategic Center for Natural Gas and Oil (NETL/SCNGO) implements a portfolio of Fossil Energy research & development (R&D) programs aimed at protecting the environment while enhancing domestic oil and gas exploration and production.

Natural gas and crude oil provide two-thirds of our Nation's primary energy supply and will continue to do so for at least the next several decades, as the Nation transitions to a more sustainable energy future. The natural gas resource estimated to exist within the United States has expanded significantly, but because this resource is increasingly harder to locate and produce, new technologies are required to extract it. This is also

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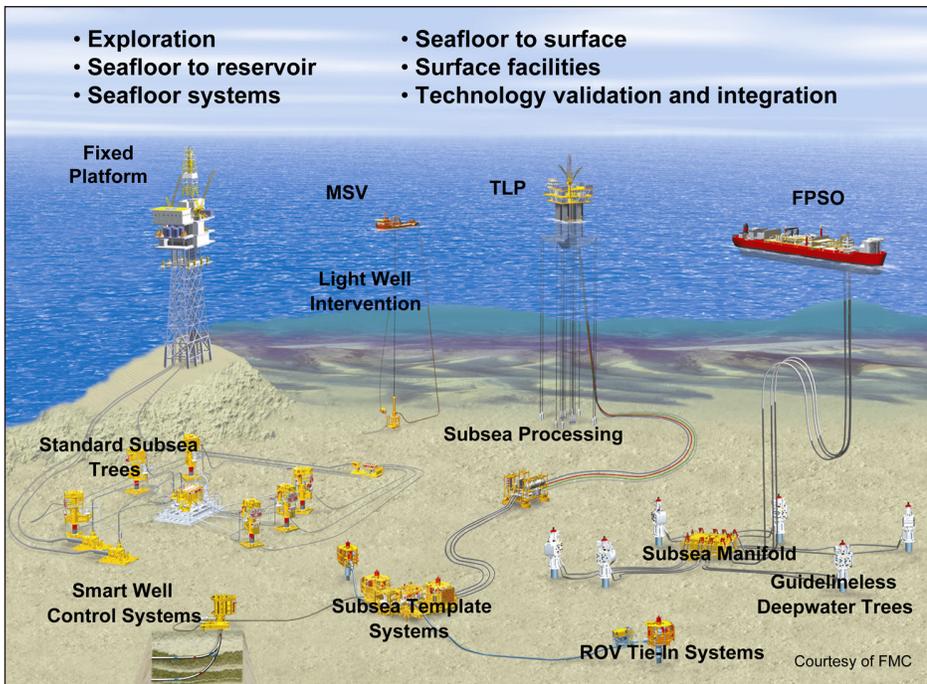
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*Ultra-deepwater architecture and technology.*

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true for the domestic oil resource, much of which will need to be produced from very deep water, forced from residual pockets left in older reservoirs, or extracted from unconventional deposits, all of which are difficult to develop with existing technology, even at current prices.

In August 2005, the Energy Policy Act of 2005 (EPAcT) was signed into law. Title IX, Subtitle J, Section 999 of EPAcT adds another dimension to the overall NETL/SCNGO oil and gas R&D effort, enhancing opportunities to demonstrate technologies in the field and accelerate their implementation in the marketplace. The *Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research Program* launched by EPAcT is a public/private partnership valued at \$400 million over eight years that is designed to benefit consumers by developing technologies to increase America’s domestic oil and gas production and reduce the Nation’s dependency on foreign imports. A portion of the funding is directed towards cost-shared research, while another portion is used by NETL to carry out complementary R&D.

Funding for the program is prescribed by EPAcT as follows:

- Ultra-deepwater architecture and technology (35% of funds).
- Unconventional natural gas and other petroleum resource exploration and production technology (32.5%).
- The technology challenges of small producers (7.5%).
- Research complementary to the above conducted by NETL (25%).



## Cost-Shared Research

EPAcT required the DOE to competitively select and award a contract to a consortium to administer the cost-shared portion of the program comprised of three elements: Ultra-Deepwater, Unconventional Resources, and Small Producers. The Research Partnership to Secure Energy for America (RPSEA), a 501(c)(3) not-for-profit corporation consisting of over 170 member organizations, was the industry consortium selected to administer these three elements. NETL, on behalf of the Secretary of Energy, maintains oversight and review of the contract with RPSEA and the entire R&D program. The companies, universities, and other organizations that receive funds through this program provide cost-share contributions of 20 to 50 percent or more.

The RPSEA contract was initiated in January 2007 and together with NETL/SCNGO produced the first annual plan for the cost-shared portion of the program. A total of 42 projects were awarded under the 15 solicitations for 2007. Sixteen projects were awarded under the Ultra-Deepwater program element, nineteen projects under the Unconventional Resources element, and seven projects under the Small Producers element.

Solicitations based on Annual Plans for 2007 through 2012 are summarized in the following tables.

UCR Program Solicitations, Selections and Awards

Funding Year	Solicitations	Selections	Awards
2007	1	19	19
2008	1	9	9
2009	1	11	10
2010	1	8	8
2011	1	15	Pending
2012	Pending		

UDW Program Solicitations, Selections and Awards

Funding Year	Solicitations	Selections	Awards
2007	13	17	16
2008	11	14	14
2009	5	11	11
2010	7	19	18
2011	2	Pending	
2012	Pending		

SP Program Solicitations, Selections and Awards

Funding Year	Solicitations	Selections	Awards
2007	1	7	7
2008	1	6	6
2009	1	6	6
2010	1	3	2
2011	1	9	4
2012	Pending		

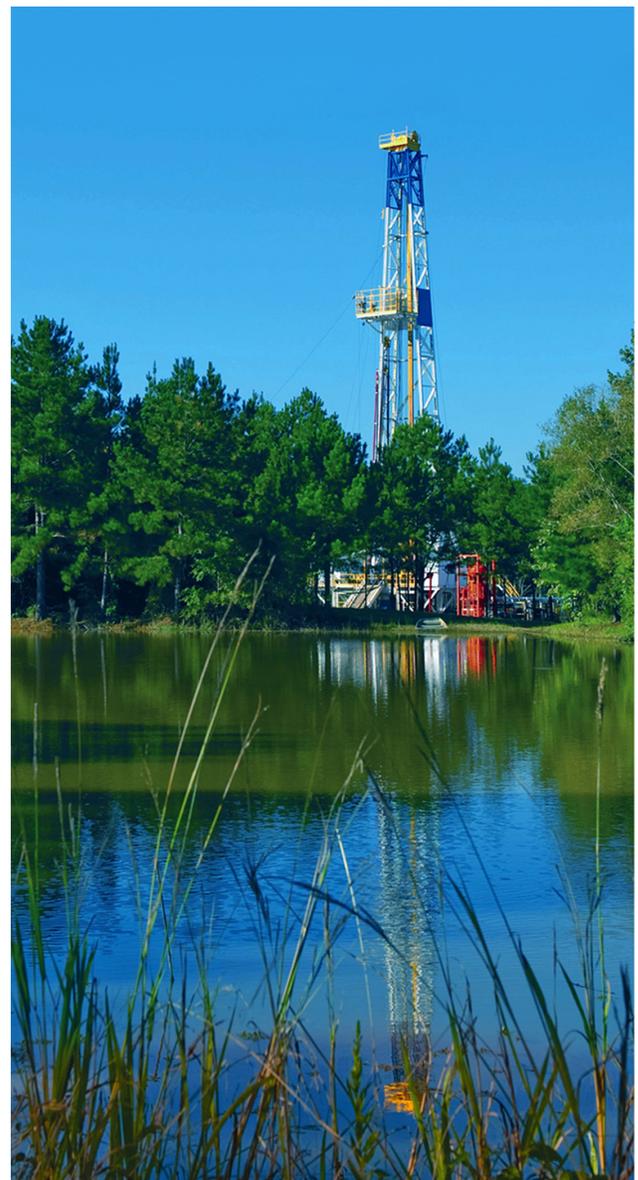
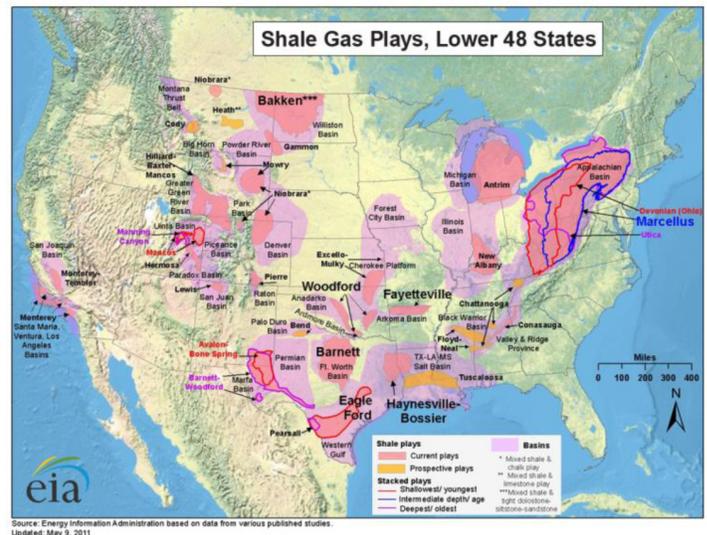
The current status of the Section 999 portfolio is 72 active projects with 32 in Ultra-Deepwater, 27 Unconventional Resources, and 17 in Small Producers. A total of 54 projects have been completed to date and 23 projects remain to be awarded. Completed project final reports can be found at <http://www.netl.doe.gov/technologies/oil-gas/EPAct2005/Projects/sec999-final-reports.html>

For a complete list and overview of the Section 999 cost shared projects, please see NETL’s recently developed Knowledge Management Database (KMD) website at <http://www.netl.doe.gov/kmd>.

The KMD was developed as part of the Complementary Program, discussed below, and is the cornerstone of NETL’s Integrated Technology Transfer Program. The KMD provides access to content from dozens of CDs and DVDs related to oil and natural gas research that NETL has published over the years. It also provides links to reports, data sets, and project summaries from ongoing research supported by the Office of Fossil Energy’s Oil and Natural Gas Program. Most recently the 9,000 DOE documents in the KMD have been made available through the Society of Petroleum Engineers (SPE) OnePetro online document repository on the OnePetro website ([www.onepetro.org](http://www.onepetro.org)), together with documents from SPE, the Society of Exploration Geophysicists, the American Association of Petroleum Geologists, the Society of Petrophysicists and Well Log Analysts, the Offshore Technology Conference, and eight additional professional societies.

As a result of the Macondo incident, an increased emphasis on safety and environmental sustainability themes will be reflected in both the Extramural and Complementary elements of the Program. In particular, the onshore element is now focused on oil and gas development safety and environmental risks, especially those associated with gas shale hydraulic fracturing.

The Annual Plan for 2012 has been completed and sent to Congress; thus far, 24 projects were selected for award from the 2011 solicitations for the Unconventional Resources Program and the Small Producers Program elements. Selections are still pending for Round 1 of the 2011 Ultra-Deepwater Program. The Round 2 solicitation will close December 18, 2012.



Copies of all annual plans and other reports from the Federal Advisory Committees are available on the Department of Energy website at [http://www.fe.doe.gov/programs/oilgas/ultra\\_and\\_unconventional/2011-2012\\_Committees/2011\\_annual\\_plan.pdf](http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/2011-2012_Committees/2011_annual_plan.pdf).

The 2013 Annual Plan has been reviewed by two Federal Advisory Committees and is expected to be sent to Congress in December of 2012.

## Complementary Research

The Complementary R&D Program is being carried out by NETL's Office of Research and Development as directed by the Office of Fossil Energy. Subsequent to the Macondo incident, the Complementary Program has begun to focus on field and lab based research that will result in risk assessments suitable to provide a robust foundation for scientifically based regulatory decision making. The Complementary Program R&D is divided into offshore and onshore study groups as follows:

- **FY13 Complementary Program Onshore R&D Overview**
  - Characterize baseline environmental signals
  - Fugitive air emissions
  - Produced water composition and quantities
  - Fluid-gas-rock interactions in shale
  - Prediction of fracture propagation and other subsurface phenomena
  - Coupling microseismic measurements and geomechanical models
  - Naturally-occurring geochemical tracers
  - High-TDS water and gas in shallow reservoirs
  - Effects of shallow gas on wellbore cementing
  - Integrated assessment modeling for predicting potential risks to groundwater
  
- **FY13 Complementary Program Ultra-Deepwater R&D Overview**
  - Metallic components & cement barriers
  - Multiphase Fluids in HPHT systems
  - Flow assurance & quantification
  - Systems models for risk prediction & response (subsurface, wellbore & water column)
  - Rapid Detection & In Situ Characterization studies

As noted in the above overviews, both onshore and offshore major study areas support overall risk assessment associated with environmental impact of operations and key technology areas.

## Measuring Performance

During FY11 a peer reviewed analysis was performed to estimate program benefits based on research being undertaken in support of the Section 999 program requirement to estimate royalties that are expected to result from the increase in production of oil and gas resulting from the Program research portfolio. The 98 projects awarded in the 2007, 2008 and 2009 solicitations, in addition to the complementary research projects undertaken during the same period, were utilized in the analysis. The benefits results were forwarded to HQ to support of the royalty estimate.

## Looking Ahead

The Section 999 program has passed its midpoint. The early years saw the award of projects in a broad range of topics and sectors. Subsequent project selections have narrowed the focus of the projects based on the relative success of the initial awards.

In response to the 2010 Macondo oil spill, DOE began refocusing the Section 999 Program on Safety and Environmental Sustainability (S&ES). Drivers for the Program now include reports and recommendations coming from studies of the 2010 Macondo incident and onshore shale gas development issues. These drivers currently include: The President's "Blueprint for a Secure Energy Future"; The BP Oil Spill Commission Report to the President; The Secretary of Energy's Advisory Board, Shale Gas Subcommittee 90-day Report; and, The Secretary of Interior's The Ocean Energy Safety Committee's ongoing meetings of the subcommittee's on Spill Prevention, Containment, Spill Response, and Safety Management and Systems.

